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ABSTRACT

The University of North Carolina at Wilmington (UNCW) offers many of its courses through distance-education. Because UNCW offers courses through a distance-education format, these courses are eligible for accreditation review by the Southern Association for Colleges and School (SACS). UNCW underwent its most recent SACS review during the 2001-2002 academic year. The review of the distance-education courses for this review compared a distance-education course against the same course taught in a traditional classroom setting. The comparison for the SACS review did not control for several potential errors. From fall semester, 1998 through spring semester, 2002, there were 155 courses that were offered in a distance-education format. Of that number, 27 of the courses were also taught in a traditional classroom setting by the same instructor. Of that number, only two courses had enrollments in the distance-education course that were within 10% of the enrollments in the traditional education course. The purpose of this study, then, was to compare the means of the final grades of those courses (a management information systems class and a literature for children course) that were offered by the same instructor via a traditional education format and a distance-education format, controlling for textbook and semester offered. In both courses, no statistically significant difference was found. Six recommendations rose from this study: (1) all skill determinants, not just the final grades of the students, should be evaluated; (2) the quality of instruction should also be compared; (3) compare and evaluate the pre-existing skills and knowledge of the students registered in the two types of courses; (4) the students should be tracked into subsequent courses for a comparison of whether the knowledge gained from the current course, regardless of mode of instruction, provided a solid basis for the next course; (5) continue with the comparison of the other courses that were offered in both a traditional classroom setting and a distance-education setting during the same semester when controlling for both the instructor and the textbook; and (6) present the results of this study to the chair of the SACS review for UNCW. Contains 29 references, and 2 tables and 3 figures of data. Appendixes contain data. (RS)

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COMPARISON OF FINAL GRADES OF COURSES TAUGHT IN BOTH A TRADITIONAL CLASSROOM FORMAT AND A DISTANCE-EDUCATION FORMAT AT THE UNIVERSITY OF NORTH CAROLINA AT WILMINGTON

Research Methodology

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A practicum report presented to Programs for Higher Education

in partial fulfillment of the requirements for the

degree of Doctor of Education

Nova Southeastern University

October, 2002

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Abstract of a practicum report presented to Nova Southeastern University in partial fulfillment of the requirements for the degree of Doctor of Education

COMPARISON OF FINAL GRADES OF COURSES TAUGHT IN BOTH A TRADITIONAL CLASSROOM FORMAT AND A DISTANCE-EDUCATION FORMAT AT THE UNIVERSITY OF NORTH CAROLINA AT WILMINGTON

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by

Laurie J. Patterson

October, 2002

The University of North Carolina at Wilmington (UNCW) offers many of its courses through distance-education. Because UNCW offers courses through a distance-education format, these courses are eligible for accreditation review by the Southern Association for Colleges and School (SACS). In fact, SACS specifically stated that an "institution must demonstrate that … its distance-learning programs are effective and comply with all applicable criteria."

UNCW underwent its most recent SACS review during the 2001-2002 academic year. The review of the distance-education courses for this review compared a distance-education course against the same course taught in a traditional classroom setting. The comparison for the SACS review did not control for several potential errors: courses taught via the two modes were

not taught by the same instructor, did not use the same textbooks, and were not taught in the same semester.

From fall semester, 1998 through spring semester, 2002, there were 155 courses that were offered in a distance-education format. Of that number, twenty-seven of the courses were also taught in a traditional classroom setting by the same instructor. Of that number, only two courses had enrollments in the distance-education course that were within 10% of the enrollments in the traditional education course. The purpose of this study, then, was to compare the means of the final grades of those courses that were offered by the same instructor via a traditional education format and a distance-education format, controlling for textbook and semester offered.

The research question addressed for each course in this study was: "Is there a statistically significant difference between the means of the final grades of students when taught in a distance-education format as compared to those taught in a traditional classroom format while controlling for the same instructor and textbook?" The above hypothesis was tested at the level of .05 significance using a two-tailed independent samples t-test. Both courses were evaluated with one t-test value for each course. In both courses, no statistically significant difference was found.

Six recommendations rose from this study. The first three recommendations were from the literature review. The first recommendation was that all skill determinants, not just the final grades of the students, be evaluated. The second recommendation suggested that the quality of instruction also be compared. The third recommendation was to compare and evaluate the pre-existing skills and knowledge of the students registered in the two types of courses. Another recommendation was that the students be tracked into subsequent courses for a comparison of

whether the knowledge gained from the current course, regardless of mode of instruction, provided a solid basis for the next course. The next recommendation was to continue with the comparison of the other courses that were offered in both a traditional classroom setting and a distance-education setting during the same semester when controlling for both the instructor and the textbook. The last recommendation was to present the results of this study to the chair of the SACS review for UNCW.

TABLE OF CONTENTS

Page

LIST OF TABLES 8

LIST OF FIGURES 9

Chapter

1. INTRODUCTION 10

Nature of the Problem 10

Purpose of the Study 12

Significance to the Institution 12

Relationship to Seminar 13

Research Questions 13

Research Hypotheses 13

Definition of Terms 14

2. REVIEW OF THE LITERATURE 15

Introduction 15

Similar Problems 16

Research Methodologies and Designs 17

Results of Similar Studies 19

3. METHODOLOGY AND PROCEDURES 21

Methodology 21

Procedures 21

Data Collection 21

Description of Population 22

TABLE OF CONTENTS (cont.)

Description of Sample....23

Treatment: Control and Experimental Group....23

Data Analysis....24

Null Hypotheses....24

Alternative Hypotheses....25

Level of Significance....25

Region of Rejection....26

Statistical Tests....26

Assumptions....26

Limitations....27

4. RESULTS....28

Procedure One: Literature Review....28

Procedure Two: Identification of Distance-education Courses....29

Procedure Three: Identification of Traditional Classroom Courses....29

Procedure Four: Calculating and Analyzing the Data....30

5. DISCUSSION, CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS....35

Discussion....35

Conclusions....38

Implications....38

Recommendations....39

REFERENCES....41

TABLE OF CONTENTS (cont.)

APPENDIXES 44

A. UNCW Numeric Grade Scale 45

B. Grade Distribution 46

B. Means for Both Courses 47

LIST OF TABLES

Tables

1. Individual Means for Traditional Classroom and Distance-Education Formats for Both Courses 34

2. Age Demographics for Both Courses 36

LIST OF FIGURES

Figures

1. Grade spread for the introduction to management information systems course.....31

2. Grade spread for the literature for children course 32

3. Independent t-test scores for each course evaluated at UNCW 33

Chapter One

INTRODUCTION

The University of North Carolina at Wilmington (UNCW) is a comprehensive general education institution located along the Atlantic sea coast and South Carolina border that primarily serves residents of the state. During fall semester 2002, 85% of the registered undergraduate students were in-state residents (UNCW, 2002) and 3.97% were first or second tier states surrounding North Carolina.

UNCW has received high marks for its scholastic offerings. Scholastically, within the state's overall university system (UNC), UNCW ranks fourth for freshman SAT entrance scores. For the past five years, UNCW has led the UNC system for improvement in college entrance test scores. Since 1996 (when SAT scores were recentered), UNCW's comprehensive SAT scores have risen from 1045 to 1092 (UNCW, 2001a). In 1999, ACT composite scores for this institution averaged 22 (The Princeton Review, 1999, p. 188). In the 2001 annual "America's Best Colleges," printed by *U.S. News and World Report*, the institution was ranked number eight among the best public regional universities in the South (Morse & Flanigan, 2000, p. 129). In addition, the 1997 publication of the ranking showed UNCW listed in the top ten as one of the best college values among southern regional universities, where the quality of the school is compared to the net cost of attending the school (Thompson & Morse, 1997, p. 1[illegible]).

Nature of the Problem

Since 1997, when UNCW was first listed in *U.S. News and World Report* as one of the best public regional universities in the South, applications for admission have increased 17% (UNCW, 2001a). Partially in response to this increase in applications and partially in response to the need to remain competitive with other institutions, UNC's General Administration (GA)

requested that each institution within the UNC system submit plans for expanded instruction using distance-learning (UNCW, 1996). Within UNCW, the chancellor made distance-learning a part of UNCW's technology initiative (UNCW, 1998). For several years, UNCW has offered courses online; the first online courses were offered during fall semester, 1998.

Since UNCW now promotes distance-education as one of its modes of instruction, the university was required to provide evidence during a recent Southern Association of Colleges and Schools (SACS) accreditation review that their distance-education courses were comparable to the more traditional classroom versions of the same courses. Specifically, the SACS review states "an institution must demonstrate that … its distance learning programs are effective and comply with all applicable criteria" (UNCW, 2001b).

UNCW's initial response to the SACS review provided a comparison between these two modes of delivery. Each course that was compared for the SACS review was evaluated solely through a comparison of each course's mean final grade. The study acknowledged differences in class size and demographics as variable. It was stated in the SACS report that the differences in GPA were within the expected range of variability (UNCW, 2002, p. 384). The individual who prepared this section of the SACS report is not sure what tests were conducted other than determining the means of each course (L. Rogers, personal communication, October 4, 2002). The comparison also did not control for several potential errors: courses taught via the two modes that were not taught by the same instructor, did not use the same textbooks, and were not taught in the same semester. Therefore, the chair of UNCW's SACS review committee requested a better review of the modes of delivery to create a better control for some of these variables (K.W. Spackman, personal communication, January 31, 2002).

Purpose of the Study

The purpose of this *ex post facto* study was to compare the final grades of two courses that were offered by the same instructor via a traditional education format and a distance-education format. The first course, introduction to management information systems (PDS 313) was taught spring semester, 2000. The enrollment for the traditional classroom class was 44 (three of whom withdrew by mid-semester and were not included in the final tally). The distance-education counterpart had an initial enrollment of 48 with one student withdrawing before mid-semester. This student's information was also not included in the final tally. The second course, literature for children (Eng 380) was taught fall semester, 2001. Its traditional classroom enrollment was 38, with an enrollment of 36 in its distance-education counterpart. Due to the fact that the courses offered extended across a range of subjects, each traditional education course format was compared with its distance-education counterpart.

Significance to the Institution

The UNC president mandated that all campuses of the UNC system offer distance-education courses, resulting in UNCW's offering of many courses via a distance-education format. UNCW states that it offers a quality education to the residents of the southeast region of North Carolina. The courses offered via a distance-education format have not yet been accurately compared with their traditional classroom counterparts. A comparison of both courses would provide evidence to the institution regarding the success rate of their distance-education courses.

This information would also provide the university with the statistics it needs for accreditation purposes. In addition, departments offering the courses would be able to assess the

effectiveness of their courses. The information could be utilized for planning purposes by departments, colleges, and the university.

Relationship to Seminar

This practicum was related to the Research Methodologies course. Specifically, this practicum involved a comparison of courses taught in a traditional classroom setting with the same courses taught in a distance-education format. The concepts and principles learned in the research methodologies course provided a basis for this comparison and aided in the evaluation of the data.

Research Questions

Two research questions were addressed in this study. The same question was addressed for each course. Specifically, the questions were:

1. "Is there a statistically significant difference between the means of the final grades of students in the introduction to management information systems course when taught in a distance-education format as compared to grades of students taught in a traditional classroom format while controlling for the same instructor and textbook?"
2. "Is there a statistically significant difference between the means of the final grades of students in the literature for children course offered spring semester, 2002, when taught in a distance-education format as compared to grades of students taught in a traditional classroom format while controlling for the same instructor and textbook?"

Research Hypotheses

The purpose of this study was to determine how the independent variable or the method of instruction affected the dependent variable or the final grades of students in the two courses.

Specifically, two courses were compared and two research hypotheses were created. The same research hypothesis was listed for each course compared.

1. "There will be no statistically significant difference between the means of the final grades of students in the introduction to management information systems course when taught in a distance-education format as compared to grades of students taught in a traditional classroom format while controlling for the same instructor and textbook?"
2. "There will be no statistically significant difference between the means of the final grades of students in the literature for children course offered spring semester, 2002, when taught in a distance-education format as compared to grades of students taught in a traditional classroom format while controlling for the same instructor and textbook?"

Definition of Terms

Dependent Variables. In this *ex post facto* study, the dependent variable was the final grade a student received in a course that is being compared.

Distance-education. Distance-education is defined as providing education or training to an off-campus site via audio, video, or computers.

Distance-Education Students. Distance-education students refer to those students who are taking a course via a distance-education format. It does not distinguish between students who are located off-campus and taking the course or are located on-campus and taking the course.

Independent Variables. In this *ex post facto* study, the independent variable was the method of instruction.

Chapter Two

REVIEW OF THE LITERATURE

Introduction

Within the U.S., education and ways of sharing and using knowledge are important to society. It is also important that education meet the needs of society (Maehr and Braskamp, 1986). U.S. Department of Education statistics from fall 1995 showed that many institutions were offering distance-education courses. Forty-four percent of 2- and 4-year institutions (such as UNCW) offered distance-education courses during the 1997-1998 academic year (U.S. Department of Education, 1999). The U.S. Department of Education estimated that in 1995, one-third of higher education institutions offered distance-education courses. During the same period, the Department of Education stated an additional 25% of post-secondary institutions were planning to offer a distance-education course within three years (U.S. Department of Education, 1998).

It is believed that students do not receive a comparable education in a distance-education course because students do not have direct contact with an instructor (Chambers, 1993, p. 4). Most studies, however, that have evaluated the effectiveness of distance-education have found that it is as effective as the traditional form of teaching (Siantz, Pugh, and Appelman, 1995, p. 6). Data, from a study conducted in 1996 (Meskill, Swan, and Frazer, 1997, p. 15), suggest that web-based multimedia collaboration is as successful when compared to a traditional classroom setting.

Some of the literature indicates that a comparison between a traditional classroom course and a distance-education course is faulty. The design of this type of study fails to consider a multitude of variables (such as the socio-demographics of the learner, learning styles, or

psychological theories) that may influence student learning (Lockee, Moore, and Burton, 2001, p. 60). To have a clearer grasp of any differences between the two versions of the courses being offered, as many of the variables as possible, such as level of information and interaction between the two classes, must be kept to a minimum (Barron, 1985, p. 13).

While much of the literature reports that there is no significant difference between these two settings that can be determined by statistical tests, this determination is interpreted to mean that distance-education is as effective as a traditional classroom setting (Lockee, Moore, and Burton, 2001, p. 62). The "no significant difference" result is inconclusive and does not mean that either mode of instruction is good (Lockee, Moore, and Burton, 2001, p. 62).

In this type of study, the null hypothesis is tested as the expected outcome. This means the null hypothesis is accepted as true. The final result, then, is that the researcher speculates about what happened to produce the end result and does not have hard data to support the speculation (Lockee, Burton, and Cross, 1999, p. 467).

Similar Problems

Traditionally, the determination of a course's success is based upon how well students demonstrate they have absorbed the content of the course (National Institute of Standards and Technology, 1994). The demonstration is usually reported by test scores and grades. Studies, using this method that compare distance-education courses with the same course offered in a traditional setting tend to show that there is little statistical difference between the two courses (Gagne and Shepherd, 2001, p. 58). As noted earlier in this document, most of the data suggested that the offering of a course via distance-education would be as successful as a course taught in a traditional classroom setting (Jacobs, 1996; U.S. Department of Education, 1999; Barron, 1985; National Institute of Standards and Technology, 1994).

In one example, at Brigham Young University, a course in health and physical education was offered in both a traditional setting on campus and through an online setting (Davies and Mendenhall, 1998). Although the course was taught by different instructors, it was found that there was no significant difference between the traditional classroom and the online versions (Davies and Mendenhall, 1998, p. 16). In this course, students were given pre- and post-test fitness exams, so there was a better grasp of the initial skills of both sets of students (Davies and Mendenhall, 1998, p. 6).

Research Methodologies and Designs

In a media comparison study (a comparison of a distance-education course against another medium of instruction), it is assumed that each method of instruction used is unique (Lockee, Moore, Burton, 2001, p. 60). The research design uses the method of checking if an independent variable affects the dependent variable (Lockee, Moore, Burton, 2001, p. 60). In these studies, the independent variable has been the method of instruction and student grades have been the dependent variables. Most of the studies reviewed kept the number of extraneous variables, such as the same textbook, tests and the same instructor, at a minimum to further control the possible differences between the two modes of instruction. The most frequently used assessment (a comparison between homework and exam grades) is one that pre-exists in the traditional classroom format (Ryan, 2000, p. 79). This assessment is the comparison between homework and exam grades.

A variety of tests were conducted to compare these course assessments. The analysis of variance (ANOVA) is a test that compares the means of two samples and then tests where the differences between the two means is statistically significant. In a study comparing a distance-education and traditional classroom graduate accounting class, a one-way fixed effect ANOVA

was used to compare four performance measures (tests and homework assignments) (Gagne and Shepherd, 2001, p. 60). In a comparison conducted for the Fischler Graduate School of Education and Human Services, Nova Southeastern University, the ANOVA was used to compare the means of final grades of students in traditional classroom courses and students who took the same course via the Internet (Fredda, 2000, p. 2).

In a comparison conducted for Indiana State University, the ANOVA test was expanded out to compare a variety of means for the two different modes of instruction. The ANOVA was used to compare the means of the two samples' final grades for a semester and across multiple semesters in which the two modes of instruction for the course were used (Yaw and Gilman, 1999, p. 8).

To determine the means of the final grades for use by the ANOVA test, the letter grades were converted to numbers on a 4.0 scale, with "A" = 4.0, "B" = 3.0, and so on (Yaw and Gilman, 1999, p. 8). In one case, only the means of "successful" grades were compared. Successful grades were identified as A, B, C, and Pass or Satisfactory (MacFarland, 1998, p. 3).

In addition to the ANOVA, some of the studies used a chi-square test. The chi-test measures how frequently data appears (Ravid, 1994, p. 221). In a report for Nova Southeastern University, the chi-square test compared the frequency that successful grades appeared. In this case, successful grades also used the above definition (McFarland, 1998, p. 3). In a study for the University of Oklahoma, a chi-square was used in conjunction with a t-test to determine if there were any socio-demographic conditions that may have influenced the course outcomes (Leasure, Davis, and Thievon, 2000, p. 3).

While a variety of tests were conducted to compare these course assessments, the t-test was used most frequently. A t-test is used to determine if the differences between groups are

significantly different (Ravid, 1994, p. 176). Although differences are expected between groups, the t-test checks to see if the differences are caused by sampling errors or by chance (Ravid, 1994, p. 176). For example, in a study conducted at Tyler Junior College in Tyler, Texas, the t-test was used to determine if there were pre-existing differences in students who registered for political science courses in the two modes of instruction (Glenn, 2001, p. 20). Using an independent samples t-test allowed researchers to compare the pretest scores between the two groups.

Results of Similar Studies

In a study conducted at the University of Okalahoma, two courses were compared over two different semesters. The final grades of students in the distance-education or online course were compared to those of students in the traditional classroom or lecture course. There was no significant difference between the final grades of students (Ryan, 2000, p. 81).

At the Fischler Graduate School of School of Education and Human Services, Nova Southeastern University, many of the graduate courses are offered in an Internet-based format. A comparison of those final grades with the same course offered on-campus showed that the means of the grades for the Internet course were significantly greater in two of the four courses compared (Fredda, 2000, p. 5-6). The other two courses did not show any statistical difference between the Internet-based course and the on-campus course (Fredda, 2000, p. 3, 8).

In a report for Indiana State University, comparisons for distance-education and traditional classroom course formats using means, standard deviations, and t-tests, showed there were no significant differences between the two formats (Yaw and Gilman, 1999, p. 6). The researchers, however, used a two-way ANOVA test on the grade points of the two course formats over three semesters. In two of the three semesters, the mean grade point of the students

in distance-education format was slightly higher than that of the students in the traditional classroom setting. There was, however, no significant difference between students' final grades in the two course formats (Yaw and Gilman, 1999, p. 10).

Chapter Three

METHODOLOGY AND PROCEDURES

Methodology

This study was conducted by using a research methodology. An *ex post facto* design compared the traditional classroom course against the distance-education course to determine if there was any statistically significant difference between the final grades of the two sets of courses. Research hypotheses were developed, the level of significance was determined, the null hypotheses were tested, and inferential statistics were used for the results.

Procedures

Data Collection

There were five procedures used to complete this research practicum. The procedures are as follows.

Step one was a literature review conducted using distance-education, traditional classroom, final grades, and other related terms as the search terms. This procedure was accomplished by using online database search engines such as ERIC (Educational Resources Information Center).

Step two was the identification of two courses taught at UNCW that had a course section code of 260-274 (online with all instruction delivered via the Internet). This was accomplished through contacting UNCW's registrar's office and requesting a list of such courses.

Step three was a review of sections for the same course offered in the same semester in a traditional classroom setting with the same instructor. Courses selected had similar enrollments between the traditional classroom version and the distance-education version. These courses were identified by course section codes of 001-259 (on-campus class and lab). This review

entailed connecting to UNCW's computer system, looking up the course that was offered online, and checking to see if the same course was taught by the instructor in a traditional classroom setting.

Step four was collecting the various final grades from both sets of courses and plotting them in a spreadsheet format. The final grades of each of the samples were recorded in two spreadsheets to keep the information separate between the experimental and control groups. Because the grades at UNCW are represented on an ordinal grading scale of A-F with "A" equivalent to a numerical scale of 4 and "F" equivalent to a 0 (zero), the grades were converted to their numerical equivalent. Appendix A provides the numeric value of grades for UNCW courses. All grades were included, including those of students who failed the courses. The number of students who withdrew from the class with a "W" was noted as withdrawn. Students who withdrew from the class with a "WF" (Failure/Late Withdrawal) were treated as though they had received an "F. The means for each course were determined and a two-tailed independent samples t-test was used to compare the means of the experimental and control group samples.

Step five was the publication of the data in a report. The report was submitted to the chair of the SACS review committee.

Description of Population

The population from which the sample was drawn for this study consisted of all students who had been registered in a traditional classroom course or in a distance-education course of two UNCW courses. These courses were "Introduction to Management Information Systems" and "Literature for Children." These students were primarily from the state of North Carolina and were all undergraduate students. The information gathered from this study could be applied to all current and future on-campus and distance-education students who enroll in either the

introduction to management information systems or the literature for children course when both sections are taught by the same instructor.

Description of Sample

The population was divided into two groups: those who registered for the distance-education course and those who registered for the traditional classroom course. These two groups enrolled for the course during the same semester and used the same textbook and instructor. The two groups were defined as "experimental group" (distance-education setting) and "control group" (traditional classroom setting). The student determined the course in which s/he enrolled. The average size of each of the courses was 40 students.

The student sample was determined by comparing distance-education courses taught since fall semester, 1998 with the same course taught in a traditional classroom setting during the same semester and by the same instructor. Courses that matched these criteria with similar enrollment sizes were chosen, resulting in two courses.

Treatment: Control and Experimental Group

The control group of the study was the traditional classroom setting for both courses reviewed. Despite the fact that both classes were housed in different departments, the courses were both handled in a similar manner. Both the traditional classroom settings of the introduction to management information systems and literature for children were taught in a classroom located on campus.

The instruction format for the control group of introduction to management information systems was primarily a lecture format with the instructor standing at the front of the classroom and presenting the information. The instruction format for the literature for children control group was a discussion format with information provided by the instructor followed by

discussion between the students and the instructor. The management information systems course had in-class exams while the literature for children course had periodic assignments that were due throughout the semester.

The distance-learning group was the experimental group. For the management information systems course, the course was taught via an asynchronous mode on the Internet. The students, for this section, were required to be on campus for an orientation to the course and to return to campus for periodic exams. For the literature for children course, the course was taught via a synchronous mode with interactive television. At no time were the students required to come to campus for instruction or exams.

Data Analysis

The final grades of each of the samples were recorded in spreadsheets to keep the information separate between the experimental and control groups. Grades at UNCW are represented on an A-F scale with "A" equivalent to a numeric scale of 4 and "F" equivalent to a 0 (zero). The grades were converted to their numeric equivalent. All grades were included, including those of students who failed any of the courses. Grades from students who withdrew from the class with a "W" were ignored. Students who withdrew from the class with a "WF" (Failure/Late Withdrawal) were treated as though they had received an "F. The numeric equivalents were added together and the mean for each section was determined. The means of each course were then analyzed using statistical software with a two-tailed independent samples t-test.

Null Hypothesis

Two null hypotheses were created for this study. They were as follows.

1. "There will be no statistically significant difference between the means of the final grades of students in the introduction to management information systems course when taught in a distance-education format as compared to grades of students taught in a traditional classroom format while controlling for the same instructor and textbook?"
2. "There will be no statistically significant difference between the means of the final grades of students in the literature for children course offered spring semester, 2002, when taught in a distance-education format as compared to grades of students taught in a traditional classroom format while controlling for the same instructor and textbook?"

Alternative Hypothesis

Two alternative hypotheses were created for this study. They were as follows.

1. "There will be a statistically significant difference between the means of the final grades of students in the introduction to management information systems course when taught in a distance-education format as compared to grades of students taught in a traditional classroom format while controlling for the same instructor and textbook?"
2. "There will be a statistically significant difference between the means of the final grades of students in the literature for children course offered spring semester, 2002, when taught in a distance-education format as compared to grades of students taught in a traditional classroom format while controlling for the same instructor and textbook?"

Level of Significance

The above null hypothesis was tested at the level of .05 significance. This level of significance was chosen with some certainty that the results would fall within a 95% range of confidence.

Region of Rejection

The region of rejection for the hypothesis described above was two-tailed. A two-tailed test was used since the research hypothesis is non-directional for effect of instructional method on grade outcomes. The 5% region of rejection area was equally divided between the two tails.

Statistical Tests

The arithmetic means of the final grades of each course was determined by adding all the corresponding letter grade values and dividing the result by the number of students who received a final grade. Once those values had been determined, the two-tailed independent samples t-test was used for comparing the means of the experimental and control group samples. The t-test was used because each of the courses was a small sample and was drawn from the same parent population.

A statistical analysis software was utilized to compare the final grades or scores of the two groups. The means and standard deviations for each group were also determined. Results were kept separate for each of the different courses.

Assumptions

There were several assumptions required by this study. First, it was assumed that the instructors for both the traditional and distance-education courses provided consistent instruction for each of the two groups. Second, it was assumed that the instructors used the same criteria for grading in each of the two courses. Third, it was assumed that the information provided to students and the testing of those students was similar enough across the two methods of instruction to have been only a minor influence on the outcome. Fourth, it was assumed that all of the students registered in both sets of courses had an equal chance to pass the course. Fifth, it

was assumed that each group entered the course with the prerequisite skills needed to complete the course.

Limitations

The results were limited to the University of North Carolina at Wilmington. Within the two groups, students determined which mode of instruction they would take. The two populations were self-selected during the registration process. Other independent variables, such as pre-existing differences among the students and the times at which the courses were taken, could not be controlled. The study, then, is limited by circumstances that may be unique to the UNCW setting and the needs of its students and can only be generalized to students enrolled in either the introduction to management information systems or the literature for children course.

Chapter Four

RESULTS

The purpose of this study was to compare the University of North Carolina at Wilmington's distance-education courses with the same course offered in a traditional classroom setting. The comparison was initiated to gather data for future accreditation visits to UNCW. The results for each procedure are discussed below.

Procedure One: Literature Review

For the first procedure, a literature review was conducted to collect information related to other students or research that compared the grades of students in a traditional classroom setting with those of students in a distance classroom setting. The literature was retrieved through several databases, including ERIC, Wilson Education Full Text, ProQuest Direct, and Digital Dissertations. Terms, such as distance-learning, distance-education, traditional classroom, final grades, comparison study, and other related terms were used as the search terms.

The research confirmed that there were no statistically significant differences between the means of grades of students who take a distance-education course or the traditional classroom counterpart. There were instances of the distance-education course having a higher final mean, while there were instances of the traditional classroom having the higher mean grade, and still other examples where both modes of instruction had no significant difference between the final grades.

Some of the research, however, did suggest that this type of study is invalid because it is not comparing or evaluating the socio-demographics of the learners or their learning styles (Lockee, Moore, and Burton, 2001, p. 60). The result of "no significant difference" is

inconclusive and does not evaluate whether the quality of instruction is good (Lockee, Moore, and Burton, 2001, p. 62)

Procedure Two: Identification of Distance-education Courses

The second procedure involved the identification of the courses that could be evaluated. Courses that matched the distance-education criteria were identified by their course section number. Courses with a section number of 260-274 (online with all instruction delivered via the Internet) or 845-859 (extension courses offered online) were selected. This was accomplished by contacting UNCW's Office of the Registrar and requesting a list of courses with those specific section numbers.

From fall semester, 1998 through spring semester, 2002, 155 courses were offered in a distance-education format. Courses that were offered during summer sessions were eliminated because the population of individuals who take summer classes is not necessarily representative of the population of students who take courses during the regular academic year. This elimination reduced the number of possible courses by ten.

Procedure Three: Identification of Traditional Classroom Courses

Procedure three was a review of other courses offered during the same semester as the above distance-education courses. The courses under review were all those courses that had a counterpart that was offered in a traditional classroom format. These courses were identified by course section numbers 001-199 (traditional instruction format) and 800-829 (extension with a traditional instruction format). In addition, only those sections that had distance-education sections and were taught by the same instructor were selected. This initial match reduced the number of courses from 145 to 27.

The number of courses was further reduced by comparing traditional courses offered during the day to distance-education courses offered during the day and traditional courses offered through extension with distance-education courses also offered during extension. It was believed that this reduction would increase the chance of drawing from a similar population. This reduced the number of courses to twelve.

The courses were further reduced by checking for courses that had similar enrollments (to avoid comparing the means of grades in a large class to the means of grades in a small class). Courses with enrollments that were within 10% of each other were selected. This reduced the number of classes compared to two.

Procedure Four: Calculating and Analyzing the Data

Step four was the collection of the various final grades from both sets of courses and plotting them out in a spreadsheet format. The registrar at UNCW collected the grades that were recorded for each of the courses. Collecting the information from the registrar kept the data confidential, and no names were associated with the assigned grades.

The final grades of each of the samples were recorded in an Excel spreadsheet to keep the information separate between the experimental and control groups. Each set of courses was given its own worksheet within the spreadsheet. Because the grades at UNCW are represented on an ordinal A-F scale with "A" equivalent to a numerical scale of 4 and "F" equivalent to a 0 (zero), the grades were converted to their numerical equivalent. There were no incompletes ("I") or unreported grades ("Z") associated with either set of courses. Appendix A shows the numeric scale used by UNCW. All grades were included, including those of students who failed the courses. The students who withdrew from the class with a "W" were noted as withdrawn and were not included in the final calculation. Students who withdrew from the class with a "WF"

(Failure/Late Withdrawal) were treated as though they had received an "F." The means for each course were determined and a two-tailed independent samples t-test was used to compare the means of the experimental and control group samples and to determine if there was a statistically significant difference in final grades between the distance-education course and the traditional classroom course in both sets of courses.

For the introduction to management information systems course, a two-tailed region of rejection was used with $\alpha = 0.05$ and a critical value of 2.013 at a degree of freedom of 46. The results ($z = 1.206679$) showed there was no statistically significant difference in this course when both sections are taught during the same semester and controlled for both the instructor and textbook. Figure 1 shows the number of grades given for the introduction to management information systems course. The results were achieved using SPSS statistical software and the values confirmed manually.

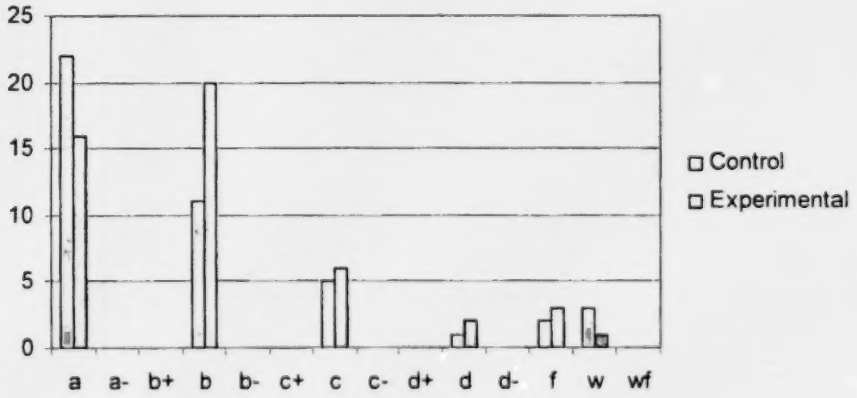

Figure 1. Grade spread for the introduction to management information systems course.

The null hypothesis for this course stated that there would "be no statistically significant difference between the final grades of students in the introduction to management information

systems course when taught in a distance-education format as compared to those taught in a traditional classroom format while controlling for the same instructor and textbook." The null hypothesis failed to be rejected for the introduction to management information systems course.

For the literature for children course, a two-tailed region of rejection was used with a α = 0.05 and a critical value of 1.993 at a degree of freedom of 72. The results (z = .339497) showed there was no statistically significant difference in this course when both sections are taught during the same semester and controlled for both the instructor and textbook. Figure 2 shows the number of grades given for the literature for children course. The results were achieved using SPSS statistical software and the values confirmed manually.

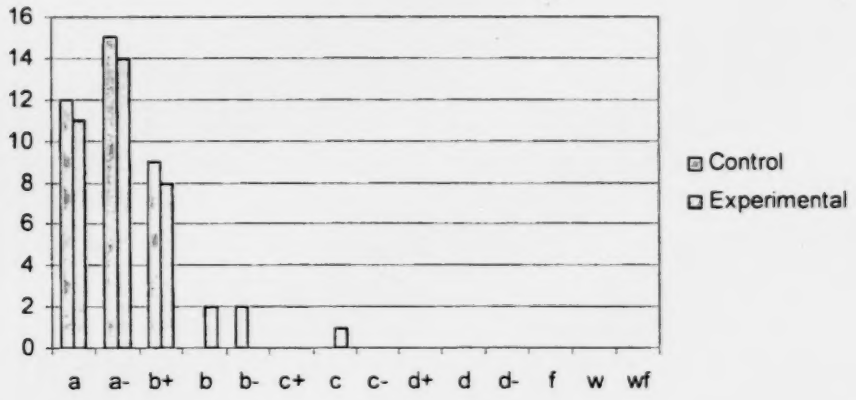

Figure 2. Grade spread for the literature for children course.

The null hypothesis for this course stated that there would "be no statistically significant difference between the final grades of students in the literature for children course when taught in a distance-education format as compared to those taught in a traditional classroom format while controlling for the same instructor and textbook." The null hypothesis failed to be rejected for the literature for children course.

Figure 3 shows the t-test scores for both the introduction to management information systems course and the literature for children course. Both independent t-test scores were below the critical values at a 0.05 level of significance. Appendix B shows the breakdown of grades for each course with the associated variance. A histogram of the mean values for the two courses can be found in Appendix C.

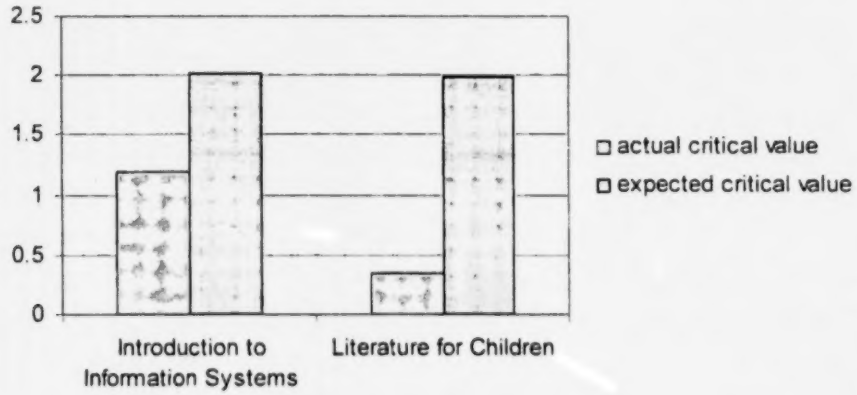

Figure 3. Independent t-test scores for each course evaluated at UNCW

Table 1 shows each course with the individual means for both the traditional classroom format and the distance-education format, the degrees of freedom (df), t-values, and p-values. Students in the traditional classroom courses, as shown in Table 1, had a higher final grade point average in all courses.

Table 1.

Individual Means for Traditional Classroom and Distance-Education Formats for Both Courses

Source	Means		Degrees of Freedom	t-values	p-values
	Traditional-Classroom Course	Distance-Education Course			
Introduction to Management Information Systems Course	3.22	2.94	46	1.206679	p>.05
Literature for Children Course	3.64	3.61	72	.339497	p>.05

Chapter Five

DISCUSSION, CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

Discussion

To remain competitive with other institutions, UNCW has made distance-learning part of its technology initiative and an integral part of its curriculum. Because distance-education is now promoted at UNCW, the university must collect data on these courses in addition to its traditional classroom courses for accreditation purposes. A recent SACS accreditation review required evidence that UNCW's distance-education courses were comparable to the traditional classroom version of the same course (UNCW, 2001b).

While UNCW's initial response to the SACS review did provide for a comparison between these two modes of delivery, the comparison did not control for instructor, textbooks, or when the course was taught. This study provided that information to the university. The results showed SACS evaluators that the university has taken the time and effort to determine if there was a difference between the two formats of delivery. In addition, departments offering the courses can use this information to assess the effectiveness of their courses or for planning purposes.

The results of this ex post facto study further supported the evidence found in the literature review that showed that the means of final grades of students in either the distance-education course or the traditional classroom course were not statistically significantly different. Chambers (1993) stated that there is a belief that students who take a course via distance-education do not receive an education comparable to those who take a course in the traditional classroom setting. Yet, studies by Siantz, et al. (1995), Meskill, et al. (1997), and Gagne and Shepherd (2001) have found that not to be the case. The results of the study also agreed with

MacFarland (1998) who found that when controlling for instructor there was no statistically significant difference between the two modes of instruction. Even if the critical value was increased to a 99% level of confidence the null hypothesis would fail to be rejected.

To better compare these two types of teaching formats, as many as the variables as possible should be controlled or kept to a minimum (Barron, 1985, p. 13). This study controlled for instructor, textbook, and semester in which the course was offered; other variables, such as existing knowledge of the student, learning styles, or student age should also be considered. In this study, the age range for students in the traditional classroom setting of the introduction to management information systems was 20-63 with a mean age of 24.3. For the distance-education setting, the age range was 20-46 with a mean age of 23.5. For students taking the literature for children course, the traditional classroom had an age range of 19-56 with a mean of 23.7 while the distance-education setting's range was 19-64 with a mean of 25. With these small differences between the two formats of teaching, the ages were very similar and could be considered controlled. Table 2 shows the age demographic for each course.

Table 2.

Age Demographics for Both Courses

Source	Mode	Mean	Minimum Age	Maximum Age
Introduction to Management Information Systems Course	Traditional-Classroom Course	24.3	20	63
	Distance-Education Course	23.5	20	46
Literature for Children Course	Traditional-Classroom Course	23.7	19	56
	Distance-Education Course	25	19	64

While some of the literature indicated that this type of comparison was faulty because it didn't take into account those additional variables (Lockee, Moore, and Burton, 2001, p. 60), this study did directly control for instructor, textbook, and semester, and the disparity of ages within the various classes was held to a minimum. Recommendations for controlling for the other variables will be discussed later in this report.

The results of these two comparisons showed that there is statistically no significant difference between the two modes of instruction when controlling for instructor, textbook, and when the course was taught. The result of no significant difference here means that the end results, student final grades, are not significantly different between the two modes of instruction. The result did not state that the course or instruction was good. This result was also supported in the literature (Lockee, et al., 2001, p. 62).

While the comparison between the two means showed there was no significant statistical difference between the two modes of instruction for this course, the internal validity of the methodology for evaluating the students in either section can be questioned. In hindsight, the instructor may believe that s/he was equal in the evaluation because assignments and grades were the same in both sections. The validity can be questioned because this statement of equality is in hindsight and cannot be verified that, at the moment of grading or assigning grades, the instructor approached each student in both sections in the same manner. While this may also be said for the evaluation of a single section, it can be assumed that the grading may have occurred differently because of the instructor's first-hand, intimate knowledge of the students in the traditional classroom setting. Without the constant personal contact that the traditional-classroom students receive, assessments of the distance-education students may have occurred under different circumstances.

Internal validity may also have been influenced by the small sample size. The total number of students compared in the introduction to management information systems 48 and 72 for the literature for children course. The interpretation of the results should be done carefully with the small sample. With a comparison over time, when the population of students who have taken the two courses becomes larger, the end results may be different.

Conclusions

Two conclusions resulted from this study. The conclusions were the result of the two research questions that asked if there was a statistically significant difference between the final grades of students in either the introduction to management information systems course or the literature for children course when taught in either a distance-education or a traditional classroom format when controlling for the same instructor and textbook.

Results from the study showed there was no statistically significant difference between the two groups within the two sets of courses. The independent samples t-test results failed to reject the null hypothesis at a 0.05 level with regard to the independent variable or method of instruction.

Implications

The results of this study led to two implications that should positively affect UNCW. First, the study compared the final grades of students registered in courses taught in a traditional classroom setting with those of a distance-education course. The information garnered in this study provides UNCW with evidence that two of its distance-education courses are as effective as the traditional classroom counterparts if final grades are compared. The second implication was that evidence is now available for future accreditation reviews by SACS.

This study provides information that could further improve education at UNCW. Additional comparisons could confirm that the two modes of instruction at UNCW are equally successful when reviewing final grades. This could encourage additional courses to be developed and offered, thus reaching more state residents (and potential distance-education students) who may want access to courses offered by UNCW.

Recommendations

As a result of this practicum, several recommendations can be made. The first recommendation arises from the literature review. All skill determinants, such as assignments, quizzes, and exams that are the same within the two methods of instruction, should be evaluated. This information would provide guidance on which method of instruction, if any, worked with any of the various skill determinants. In addition, it could also provide information regarding how students did in applying their new skills or knowledge.

A second recommendation also arises from the literature review. Because the t-test does not assess whether the quality of instruction is better in one setting or the other, it is recommended that the quality of instruction between the two methods also be compared.

A third recommendation arising from the literature review would be to compare and evaluate the pre-existing skills and knowledge of the students registered in the two types of courses. This comparison would determine if there was any statistically significant difference in those pre-existing skills of the students.

The fourth recommendation is for students in courses that are prerequisites for additional courses within a program, such as the introduction to management information systems course that a further comparison be made of the students. This comparison would compare how the

students performed in subsequent classes that build on the skills or knowledge gained in the introductory course.

The fifth recommendation would be to continue with additional comparison of other courses that are offered in both a traditional classroom setting and a distance-education setting during the same semester when controlling for both the instructor and the textbook. There are twenty-five courses that have already been offered that could be compared. In addition, as UNCW continues to offer courses in both formats, future courses should be compared in this manner as well. This continued comparison would provide information for future SACS accreditation studies of UNCW. Finally, building upon the need to provide information for accreditation purposes, the results of this study were given to the chair of the SACS review for UNCW.

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APPENDIXES

Appendix A

UNCW Numeric Grade Scale

Grade	Numeric Value	
A	4.00	
A-	3.67	
B+	3.33	
B	3.00	
B-	2.67	
C+	2.33	
C	2.00	
C-	1.67	
D+	1.33	
D	1.00	
D-	0.67	
F	0.00	
I	0.00	Incomplete
W	0.00	Withdrawn
WF	0.00	Withdrawal Failing
Z	0.00	Unreported Grades

Appendix B

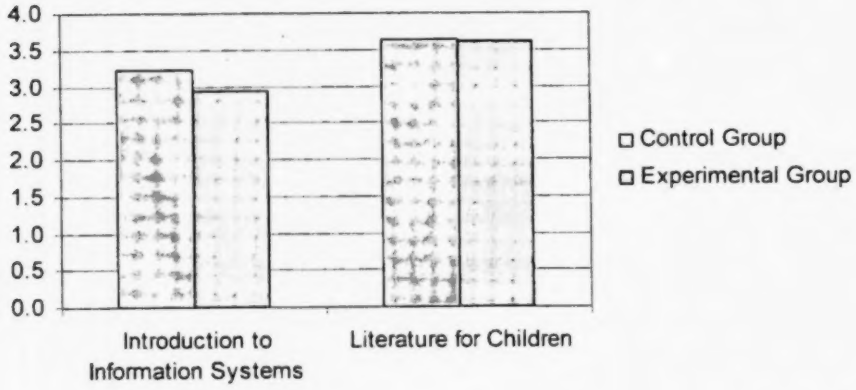
Grade Distribution

Introduction to Management Information Systems					
Section 004	Grade	Total Received	Section 260	Grade	Total Received
control	a	22	experimental	a	16
	a-			a-	
	b+			b+	
	b	11		b	20
	b-			b-	
	c+			c+	
	c	5		c	6
	c-			c-	
	d+			d+	
	d	1		d	2
	d-			d-	
	f	2		f	3
	w	3		w	1
	wf			wf	
		n_1=41			n_2=47
average		3.219512195	average		2.936170213
variance		1.175609756	variance		1.234967623

Literature for Children					
Section 001	Grade	Total Received	Section 260	Grade	Total Received
control	a	12	experimental	a	11
	a-	15		a-	14
	b+	9		b+	8
	b			b	2
	b-	2		b-	
	c+			c+	
	c			c	1
	c-			c-	
	d+			d+	
	d			d	
	d-			d-	
	f			f	
	w			w	
	wf			wf	
		n_1=38			n_1=36
average		3.641052632	average		3.611666667
variance		0.116631294	variance		0.162482857

Appendix C

Means for Both Courses



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